

## Abstract of the Disclosure

A superconducting magnesium diboride ( $\text{MgB}_2$ ) thin film having c-axial orientation and a method and apparatus for fabricating the same are provided. The fabrication method includes forming a boron thin film on a substrate and thermally processing the substrate on which the boron thin film is formed along with a magnesium source and cooling the resulting structure. The superconducting magnesium diboride thin film can be used in a variety of electronic devices employing superconducting thin films, such as precision medical diagnosis equipment using superconducting quantum interface devices (SQUIDs) capable of sensing weak magnetic fields, microwave communications equipment used for satellite communications, and Josephson devices. Computer systems with 100 times greater computing speed can be implemented with the superconducting magnesium diboride thin film.